

**Simple Photoelectric Signaling Device for Use with Chromatographic Columns.** William L. Porter, Eastern Regional Research Laboratory, Philadelphia 18, Pa.

WHEN working with the Marvel-Rands preparative silicic acid partition column (2) for the resolution of mixtures of organic acids, an average of about three fractions an hour can be collected. In practice, much time is lost in inspecting the column to determine when it is necessary to change receivers, because inherent difficulties, such as change in flow rates due to the required changes in eluting solvents, make it impossible to employ an automatic fraction cutter. Durso, Schall, and Whistler (1) employed a photoelectric circuit in their automatic fraction cutter, but they used it to change from one solvent storage bottle to another.

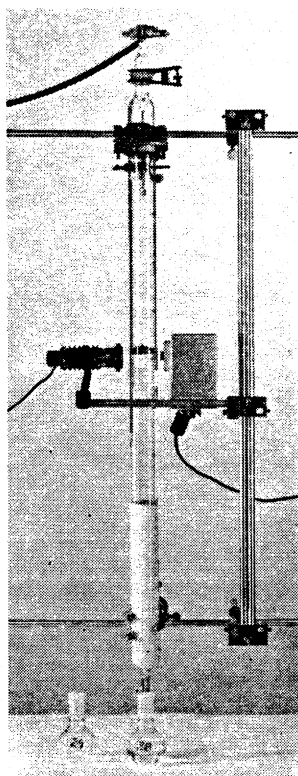
A simple photoelectric signaling device has been assembled in this laboratory to indicate the approach of the end of a fraction. Use of this device saves the operator's time.

Figures 1 and 2 describe the assembly of the equipment.

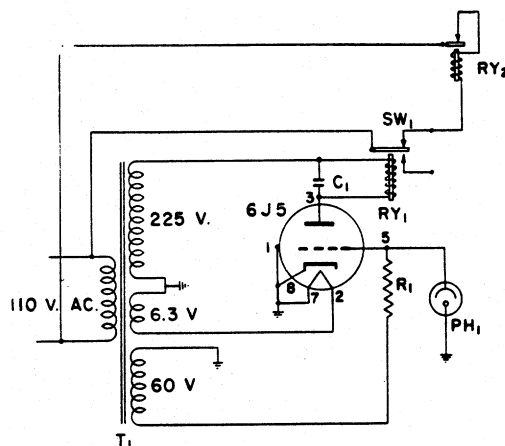
The relay has a potential of 60 volts across the 20-megohm resistor in the grid circuit. Relays that do not have this potential must be used in conjunction with a battery in the phototube circuit. A barrier-layer photocell will not operate in this circuit because it does not produce enough voltage.

The light source shown in Figure 1 is a commercial microscope illuminator; however, a simple bulb and lens system has been used effectively.

The slit leading to the phototube is made of  $\frac{1}{2}$ -inch copper pipe, the ends of which are closed by soldering on some sheet copper and drilling  $\frac{1}{8}$ -inch holes through both ends.



**Figure 1. Phototube and Light Source as Assembled in a Chromatographic Column**



**Figure 2. Diagram of Circuit for Photoelectric Signaling Device**

- T<sub>1</sub>.** Thordarson No. 1766 T-50374  
**C<sub>1</sub>.** 0.5-mfd. 400-watt direct current  
**R<sub>1</sub>.** 20-megohm, 0.5-watt  
**SW<sub>1</sub>.** Microswitch, single-pole double-throw  
**RY<sub>1</sub>.** Relay coil, 3500 ohms, Clare Co. No. 38 E.G.  
**RY<sub>2</sub>.** Buzzer, 110-volt a.c. or other indicating device  
**PH<sub>1</sub>.** Phototube C.E. 2, Continental Electric Co.

To operate, the light beam is adjusted so that it passes through the solvent in the column at a point just above the graduation marking the end volume of the fraction to be cut. As the solvent flows through the column, a glass float moving with the meniscus passes into and cuts the light beam. This in turn opens the phototube circuit, causing the relay to close the 110-volt circuit energizing the electric bell or other signal. The light beam is lowered into position for the next fraction and, when the meniscus (flat bottom of the float) reaches the graduation marking the end volume of the fraction, the receiver is changed.

The entire assembly is mounted on laboratory support rods. The phototube and light source are mounted on double rods to prevent their getting out of alignment during the repositioning of the unit. A screw and crank mechanism can be used for a more elaborate assembly.

The author wishes to express his appreciation to Roland Eddy and Charles Badgett of this laboratory for their help in the design and assembly of this equipment.

#### LITERATURE CITED

- (1) Durso, D. F., Schall, E. D., and Whistler, R. L., *ANAL. CHEM.*, **23**, 425 (1951).
- (2) Marvel, C. S., and Rands, R. D., Jr., *J. Am. Chem. Soc.*, **72**, 2642 (1950).